FORM PTO-1390 (Modified) (REV 10-95) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)
1556	09/806098

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP 99/07142	SEPTEMBER 25, 1999	SEPTEMBER 26, 1998

TITLE OF INVENTION
WIND ENERGY SYSTEM

APPLICANT(S) FOR DO/EO/US
Hugo L. SCHIPPMANN

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
    A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☒ Certificate of Mailing by Express Mail
19. ☐ Other items or information:

APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/806098	PCT/EP 99/07142	1556

The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☐	Search Report has been prepared by the EPO or JPO	$930.00
☐	International preliminary examination fee paid to USPTO (37 CFR 1.482)	$720.00
☐	No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))	$790.00
☒	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO	$1,070.00
☐	International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)	$98.00

ENTER APPROPRIATE BASIC FEE AMOUNT = $1,000.00

Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)). $0.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	16 - 20 =	0	x $18.00	$0.00
Independent claims	1 - 3 =	0	x $80.00	$0.00
Multiple Dependent Claims **(check if applicable).**			☐	$0.00

TOTAL OF ABOVE CALCULATIONS = $1,000.00

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) **(check if applicable).** ☐ $0.00

SUBTOTAL = $1,000.00

Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). + $0.00

TOTAL NATIONAL FEE = $1,000.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).** ☐ $0.00

TOTAL FEES ENCLOSED = $1,000.00

Amount to be: refunded	$
charged	$

☐ A check in the amount of to cover the above fees is enclosed.

☒ Please charge my Deposit Account No. **19-4675** in the amount of **$1,000.00** to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **19-4675** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

STRIKER, STRIKER & STENBY
103 EAST NECK ROAD
HUNTINGTON, NEW YORK 11743

SIGNATURE

MICHAEL J. STRIKER
NAME

27233
REGISTRATION NUMBER

MARCH 26, 2001
DATE

UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: Group: Attorney Docket # 1556

Applicant(s) : SCHIPPMANN, H.

Serial No. :

Filed : Simultaneously

For : WIND ENERGY SYSTEM

SIMULTANEOUS AMENDMENT

March 26, 2001

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

S I R S:

Simultaneously with filing of the above identified application please amend the same as follows:

In the Claims:

Cancel all claims without prejudice.

Substitute the claims attached hereto.

REMARKS:

This Amendment is submitted simultaneously with filing of the above identified application.

With the present Amendment applicant has amended the claims so as to eliminate their multiple dependency.

Consideration and allowance of the present application is most respectfully requested.

Respectfully submitted,

Michael J. Striker
Attorney for Applicant(s)
Reg. No. 27233

Claims

1. A wind energy system, having a wind-drivable rotor (3) with angularly adjustable rotor blades (4), a generator (8), connected directly or indirectly to the rotor (3), for generating electrical energy, in which the power output of the generator (8) is possible at variable rotor rpm, and a facility management system, which is embodied, within a predetermined wind speed range, to regulate the rotor rpm by adjustment of the rotor blade angles (5) and to turn off the operation of the system above a shutoff speed (16), characterized in that the facility management system is embodied to regulate the rotor rpm and the power output downward, by adjustment of the rotor blade angles (5), in a range between a predetermined limit speed (15) and the shutoff speed (16).

2. The wind energy system of claim 1, characterized in that the facility management system, at adequate wind speeds below the predetermined limit speed (15), is embodied to regulate the power output essentially to the value of the rated power of the system.

3. The wind energy system of claim 2, characterized in that the facility management system is embodied so as to regulate the power output, beginning at the rated power, steadily decreasingly down to the shutoff speed (16), with increasing wind speed above the predetermined limit speed (15).

4. The wind energy system of claim 3, characterized in that the facility management system is

embodied to regulate the power output and the rotor rpm as much as possible constantly to the rated power/rated rpm below the predetermined limit speed (15), and above the limit speed (15) to regulate it substantially linearly decreasingly down to the shutoff speed (16).

5. The wind energy system of claim 1, characterized in that the facility management system is embodied to regulate the power output to approximately 40% of the rated power at the shutoff speed (16).

6. The wind energy system of claim 1, characterized in that the facility management system is embodied to regulate the power output to the rated power, in the wind speed range from approximately 11.5 m/s to approximately 16 m/s.

7. The wind energy system of claim 1, characterized in that the limit speed (15) is approximately 16 m/s.

8. The wind energy system of claim 1, characterized in that the shutoff speed (16) is approximately 23 m/s.

9. A method for regulating the power output of a wind energy system of claim 1, characterized in that the rotor rpm and the power output are regulated downward by adjustment of the rotor blade angles (5) in a range between a predetermined limit speed (15) and a shutoff speed (16).

10. The method of claim 9, characterized in that at adequate wind speeds below the predetermined limit speed (15), the power output is regulated substantially

to the value of the rated power.

11. The method of claim 10, characterized in that the power output, with increasing wind speed above the predetermined limit speed (15), is regulated steadily decreasingly downward beginning at the rated power down to the shutoff speed (16).

12. The method of claim 11, characterized in that below the predetermined limit speed, as much as possible, the power output and the rotor rpm are regulated constantly to the rated power/rated rpm, and above the limit speed (15) they are regulated, essentially linearly decreasingly, down to the shutoff speed (16).

13. The method of claim 9, characterized in that the power output at the shutoff speed (16) is regulated to approximately 40% of the rated power.

14. The method of claim 9, characterized in that the power output, in the wind speed range from approximately 11.5 m/s to approximately 16 m/s, is regulated to the rated power.

15. The method of claim 9, characterized in that the limit speed (15) is approximately 16 m/s.

16. The method of claim 9, characterized in that the shutoff speed (16) is approximately 23 m/s.

Claims

1. A wind energy system, having a wind-drivable rotor (3) with angularly adjustable rotor blades (4), a generator (8), connected directly or indirectly to the rotor (3), for generating electrical energy, in which the power output of the generator (8) is possible at variable rotor rpm, and a facility management system, which is embodied, within a predetermined wind speed range, to regulate the rotor rpm by adjustment of the rotor blade angles (5) and to turn off the operation of the system above a shutoff speed (16), characterized in that the facility management system is embodied to regulate the rotor rpm and the power output downward, by adjustment of the rotor blade angles (5), in a range between a predetermined limit speed (15) and the shutoff speed (16).

2. The wind energy system of claim 1, characterized in that the facility management system, at adequate wind speeds below the predetermined limit speed (15), is embodied to regulate the power output essentially to the value of the rated power of the system.

3. The wind energy system of claim 2, characterized in that the facility management system is embodied so as to regulate the power output, beginning at the rated power, steadily decreasingly down to the shutoff speed (16), with increasing wind speed above the predetermined limit speed (15).

4. The wind energy system of claim 3, characterized in that the facility management system is

embodied to regulate the power output and the rotor rpm as much as possible constantly to the rated power/rated rpm below the predetermined limit speed (15), and above the limit speed (15) to regulate it substantially linearly decreasingly down to the shutoff speed (16).

5. The wind energy system of [one of the foregoing claims] claim 1, characterized in that the facility management system is embodied to regulate the power output to approximately 40% of the rated power at the shutoff speed (16).

6. The wind energy system of [one of the foregoing claims] claim 1, characterized in that the facility management system is embodied to regulate the power output to the rated power, in the wind speed range from approximately 11.5 m/s to approximately 16 m/s.

7. The wind energy system of [one of the foregoing claims] claim 1, characterized in that the limit speed (15) is approximately 16 m/s.

8. The wind energy system of [one of the foregoing claims] claim 1, characterized in that the shutoff speed (16) is approximately 23 m/s.

9. A method for regulating the power output of a wind energy system of [one of the foregoing claims] claim 1, characterized in that the rotor rpm and the power output are regulated downward by adjustment of the rotor blade angles (5) in a range between a predetermined limit speed (15) and a shutoff speed (16).

10. The method of claim 9, characterized in that at adequate wind speeds below the predetermined limit

speed (15), the power output is regulated substantially to the value of the rated power.

11. The method of claim 10, characterized in that the power output, with increasing wind speed above the predetermined limit speed (15), is regulated steadily decreasingly downward beginning at the rated power down to the shutoff speed (16).

12. The method of claim 11, characterized in that below the predetermined limit speed, as much as possible, the power output and the rotor rpm are regulated constantly to the rated power/rated rpm, and above the limit speed (15) they are regulated, essentially linearly decreasingly, down to the shutoff speed (16).

13. The method of [one of claims 9-12] claim 9, characterized in that the power output at the shutoff speed (16) is regulated to approximately 40% of the rated power.

14. The method of [one of claims 9-13] claim 9, characterized in that the power output, in the wind speed range from approximately 11.5 m/s to approximately 16 m/s, is regulated to the rated power.

15. The method of [one of claims 9-14] claim 9, characterized in that the limit speed (15) is approximately 16 m/s.

16. The method of [one of claims 9-15] claim 9, characterized in that the shutoff speed (16) is approximately 23 m/s.

WIND ENERGY SYSTEM

The invention relates to a wind energy system, having a wind-drivable rotor with angularly adjustable rotor blades, a generator, connected directly or indirectly to the rotor, for generating electrical energy, in which the power output of the generator is possible at variable rotor rpm, and a facility management system, which is embodied, within a predetermined wind speed range, to regulate the rotor rpm by adjustment of the rotor blade angles and to turn off the operation of the system above a shutoff speed.

One such wind energy system is known from International Patent Disclosure WO93/11604, for instance. Such wind energy systems, which use variable rotor rpm and variable rotor blade angles, produce more electrical energy than systems that use a single fixed rotor rpm and fixedly specified rotor blade angles. Typically, a variable rpm is used in the range of very low wind speeds, and the rotor blades assume a large angle relative to the incident wind, which angle is only slightly smaller than 90°. As the wind speed increases, this rotor blade angle is initially not changed, until the wind speed suffices to turn the rotor at rated rpm, and then the wind energy system produces its rated power. Accordingly, beginning at a very low power at a minimum wind speed, the power output increases along with the rotor rpm, until the rated power is reached. If the wind speed increases further, the rated power and the rated rpm are then kept as constant as possible, in that the rotor blades are adjusted farther and farther in the direction of the wind until the wind speed rises

above a shutoff speed. Here the wind energy system is turned off, by rotating the rotor blades entirely in the direction of the wind, so that the rotor blade angles relative to the wind direction amount to approximately zero degrees. This brakes the rotor. The shutoff at very high wind speeds is necessary because the load on the wind energy system in operation under strong wind conditions, especially gusts, can become so great that damage occurs.

In known wind energy systems, the rotor rpm is regulated to be constant until the shutoff speed is reached, and then the rated power is output. If the shutoff speed is exceeded, the rotor rpm is regulated downward to zero, by adjusting the rotor blade angles to the feathered pitch. These wind energy systems must naturally be dimensioned so robustly that they can still be operated at rated power and rated rpm until the shutoff speed is reached.

The object of the invention is to disclose a wind energy system of the type defined at the outset that can be less robustly dimensioned and is more economical to produce.

The invention attains this object in that the facility management system is embodied to regulate the rotor rpm and the power output downward, by adjustment of the rotor blade angles, in a range between a predetermined limit speed and the shutoff speed. Because of the regulation according to the invention, the load on the wind energy system at wind speeds above the limit speed is kept approximately constant or even reduced, so that the dimensioning of the wind energy

system need not be adapted to the relatively high shutoff speed but instead only to the relatively low limit speed. The less robustly dimensioned wind energy system can be manufactured much less expensively, at considerable savings of material and energy. The loss in produced electrical energy is negligibly slight, because of the power output that is reduced in the range between the limit speed and the shutoff speed, since wind speeds in this range, at central European sites, occur relatively rarely, and thus the wind energy system of the invention, on average over the year, produces virtually no less energy than the known systems.

To achieve an optimal energy yield at various wind speeds, it is proposed that the facility management system, at adequate wind speeds below the predetermined limit speed, is embodied to regulate the power output essentially to the value of the rated power of the system. In this wind speed range, the load on the wind energy system is still relatively slight, and so the power output can be regulated up to the highest continuous duty without reservation.

In a further feature of the invention, it is provided that the facility management system is embodied so as to regulate the power output, beginning at the rated power, steadily decreasingly down to the shutoff speed, with increasing wind speed above the predetermined limit speed]. This provision assures the highest possible power output without exceeding the maximum allowable mechanical load on the wind energy system. In particular, the regulation can be embodied such that the mechanical load at every wind speed, within the aforementioned speed range, remains constant.

In a first approximation, the load that increases with the wind speed can be compensated for by a proportional reduction in the rotor rpm, so that the total load remains essentially constant. A simply embodiment of the invention therefore comprises the provision that the facility management system is embodied to regulate the power output and the rotor rpm as much as possible constantly to the rated power/rated rpm below the predetermined limit speed, and above the limit speed to regulate it substantially linearly decreasingly down to the shutoff speed. With this very simple regulation strategy, for a given load capacity of the wind energy system, an optimum of electrical energy can be produced.

In a preferred embodiment of the invention, it is provided that the facility management system is embodied to regulate the power output to approximately 40% of the rated power at the shutoff speed. In this regulation, until the shutoff speed is reached, still a relatively large amount of electrical energy is produced. At the usual structural size of wind energy systems with electrical rated powers of approximately 1 megawatt, especially economic operation is achieved if the facility management system is embodied to regulate the power output to the rated power, in the wind speed range from approximately 11.5 m/s to approximately 16 m/s. In such wind energy systems, the dimensioning can advantageously be kept slight if the limit speed is approximately 16 m/s and the shutoff speed is approximately 23 m/s.

The subject of the invention is also a method for regulating the power output of a wind energy system in

accordance with the above description.

One exemplary embodiment of the invention will described below in further detail in conjunction with the drawings.

The drawings individually show the following:

Fig. 1: a plan view on a wind energy system;

Fig. 2: an angularly adjustable rotor blade in section;

Fig. 3: a schematic illustration of the mode of operation of the wind energy system;

Fig. 4: a graph showing the courses, regulated according to the invention, of the rotor rpm and the output power as a function of the wind speed.

The wind energy system shown, according to the invention, has a mast (2) anchored in the ground (1) and a rotor (3), mounted on the top of the mast (2), with three rotor blades (4). As shown in Fig. 2, the rotor blade angles (5) are embodied adjustably relative to the wind direction (6). As seen from the schematic illustration in Fig. 3, the rotor (3) is mechanically connected via a gear (7) to an electric asynchronous generator (8). The stator (9) of the generator (8) is connected electrically to the power grid (11). The grid frequency and the frequency generated in the stator are synchronized with one another. The rotor (10) of the generator (8) is supplied with electricity via the lines (12) from a frequency converter (13), which in turn is

connected to the lines (14) between the stator (9) and the grid (11). With the aid of the variable-frequency rotor currents generated by the frequency converter (13), a rotary field that rotates at the grid frequency can be generated in the rotor (10) despite the variable rotor speed; the frequency of the currents generated in the stator (9) are synchronized with the grid frequency. The power output of the generator (8) is thus possible at a variable rotor rpm.

The power output by the generator (8) to the grid (11), the rotor rpm, and the setting of the rotor blade angles, are monitored and regulated by a facility management system, not shown. Fig. 4 shows the course of regulation according to the invention of the output power and the rotor rpm, as a function of the wind speed.

The operation of the wind energy system is started as soon as a minimum wind speed of 2.5 m/s or more occurs, at which a rotor speed of 14 rpm is attained. With increasing wind speed, the rotor rpm increases, until the rated rotary speed of approximately 21 rpm is reached. This is the case approximately at a wind speed of 7.5 m/s. In the range of variable rotor speed, the rotor blade angles (5) are set to be quite steep, amounting to approximately 70° to 80° relative to the wind direction (6).

At higher wind speeds than 7.5 m/s, the rotor blade angles are set at about 21 m/s, the rotor rpm remains constant. The facility management system regulates the frequency and intensity of the currents imposed on the rotor (10) of the generator (8) in such a

way that the power output to the grid (11) by the generator (8) increases steadily. Beyond a wind speed of about 11.5 m/s, the rated power of 1 megawatt is reached. The rated power must not be exceeded over a long term, and the facility management system is therefore embodied such that the output power is kept constantly at rated power; the rotor blade angles (5) are regulated such that the rotor rpm is also kept largely constant, at the rated rpm of about 21 rpm.

If the wind speed exceeds a limit speed (15) that is predetermined in the facility management system and in the case of the present wind energy system is on the order of 16 m/s, then the facility management system changes over to regulating the power output downward, in order to limit the mechanical load on the wind energy system, in particular the mast (2), rotor blades (4), gear (7), and generator (8). As a result of the load limitation, the aforementioned components of the wind energy system, and optionally others as well, can be dimensioned markedly less robustly than in systems that are operated at the rated power up to the shutoff speed (16).

Beginning at the rated power, the facility management system now regulates the power output linearly downward, at increasing wind speed above the predetermined limit speed (15), to the shutoff speed (16), and shortly before the shutoff speed (16) is reached, a power output of 400 kW is still possible. In the range between the limit speed (15) and the shutoff speed (16), the rotor speed is regulated downward from the rated rpm to 18 rpm, because the facility management system sets the rotor blade angles (5) to be smaller and

smaller; the planes of the rotor blades are always oriented more in the direction of the wind speed. In the present case, the shutoff speed is 23 m/s. Here the rotor blades are put in the feathered pitch, as shown all the way to the right in Fig. 2, in which the rotor blades (4) are oriented in the wind direction (6) (rotor blade angle 5 = 0°). This causes the rotor (3) to come to a stop, and the wind energy system can be turned off.

List of Reference Numerals

1 Ground
2 Mast
3 Rotor
4 Rotor blade
5 Rotor blade angle
6 Wind direction
7 Gear
8 Asynchronous generator
9 Stator
10 Rotor
11 Grid
12 Lines
13 Frequency converter
14 Lines
15 Limit speed
16 Shutoff speed

Claims

1. A wind energy system, having a wind-drivable rotor (3) with angularly adjustable rotor blades (4), a generator (8), connected directly or indirectly to the rotor (3), for generating electrical energy, in which the power output of the generator (8) is possible at variable rotor rpm, and a facility management system, which is embodied, within a predetermined wind speed range, to regulate the rotor rpm by adjustment of the rotor blade angles (5) and to turn off the operation of the system above a shutoff speed (16), characterized in that the facility management system is embodied to regulate the rotor rpm and the power output downward, by adjustment of the rotor blade angles (5), in a range between a predetermined limit speed (15) and the shutoff speed (16).

2. The wind energy system of claim 1, characterized in that the facility management system, at adequate wind speeds below the predetermined limit speed (15), is embodied to regulate the power output essentially to the value of the rated power of the system.

3. The wind energy system of claim 2, characterized in that the facility management system is embodied so as to regulate the power output, beginning at the rated power, steadily decreasingly down to the shutoff speed (16), with increasing wind speed above the predetermined limit speed (15).

4. The wind energy system of claim 3,

characterized in that the facility management system is embodied to regulate the power output and the rotor rpm as much as possible constantly to the rated power/rated rpm below the predetermined limit speed (15), and above the limit speed (15) to regulate it substantially linearly decreasingly down to the shutoff speed (16).

5. The wind energy system of one of the foregoing claims, characterized in that the facility management system is embodied to regulate the power output to approximately 40% of the rated power at the shutoff speed (16).

6. The wind energy system of one of the foregoing claims, characterized in that the facility management system is embodied to regulate the power output to the rated power, in the wind speed range from approximately 11.5 m/s to approximately 16 m/s.

7. The wind energy system of one of the foregoing claims, characterized in that the limit speed (15) is approximately 16 m/s.

8. The wind energy system of one of the foregoing claims, characterized in that the shutoff speed (16) is approximately 23 m/s.

9. A method for regulating the power output of a wind energy system of one of the foregoing claims, characterized in that the rotor rpm and the power output are regulated downward by adjustment of the rotor blade angles (5) in a range between a predetermined limit speed (15) and a shutoff speed (16).

10. The method of claim 9, characterized in that at adequate wind speeds below the predetermined limit speed (15), the power output is regulated substantially to the value of the rated power.

11. The method of claim 10, characterized in that the power output, with increasing wind speed above the predetermined limit speed (15), is regulated steadily decreasingly downward beginning at the rated power down to the shutoff speed (16).

12. The method of claim 11, characterized in that below the predetermined limit speed, as much as possible, the power output and the rotor rpm are regulated constantly to the rated power/rated rpm, and above the limit speed (15) they are regulated, essentially linearly decreasingly, down to the shutoff speed (16).

13. The method of one of claims 9-12, characterized in that the power output at the shutoff speed (16) is regulated to approximately 40% of the rated power.

14. The method of one of claims 9-13, characterized in that the power output, in the wind speed range from approximately 11.5 m/s to approximately 16 m/s, is regulated to the rated power.

15. The method of one of claims 9-14, characterized in that the limit speed (15) is approximately 16 m/s.

16. The method of one of claims 9-15,

characterized in that the shutoff speed (16) is approximately 23 m/s.

Wind Energy System

A wind energy system, having a wind-drivable rotor (3) with angularly adjustable rotor blades (4), a generator, connected directly or indirectly to the rotor, for generating electrical energy, in which the power output of the generator is possible at variable rotor rpm, and a facility management system, which is embodied, within a predetermined wind speed range, to regulate the rotor rpm by adjustment of the rotor blade angles and to turn off the operation of the system above a shutoff speed, can advantageously be produced economically, with economies of material and energy costs, if the facility management system is embodied to regulate the rotor rpm and the power output downward, by adjustment of the rotor blade angles, in a range between a predetermined limit speed and the shutoff speed.

(Fig. 1)

09/806098

Fig. 1

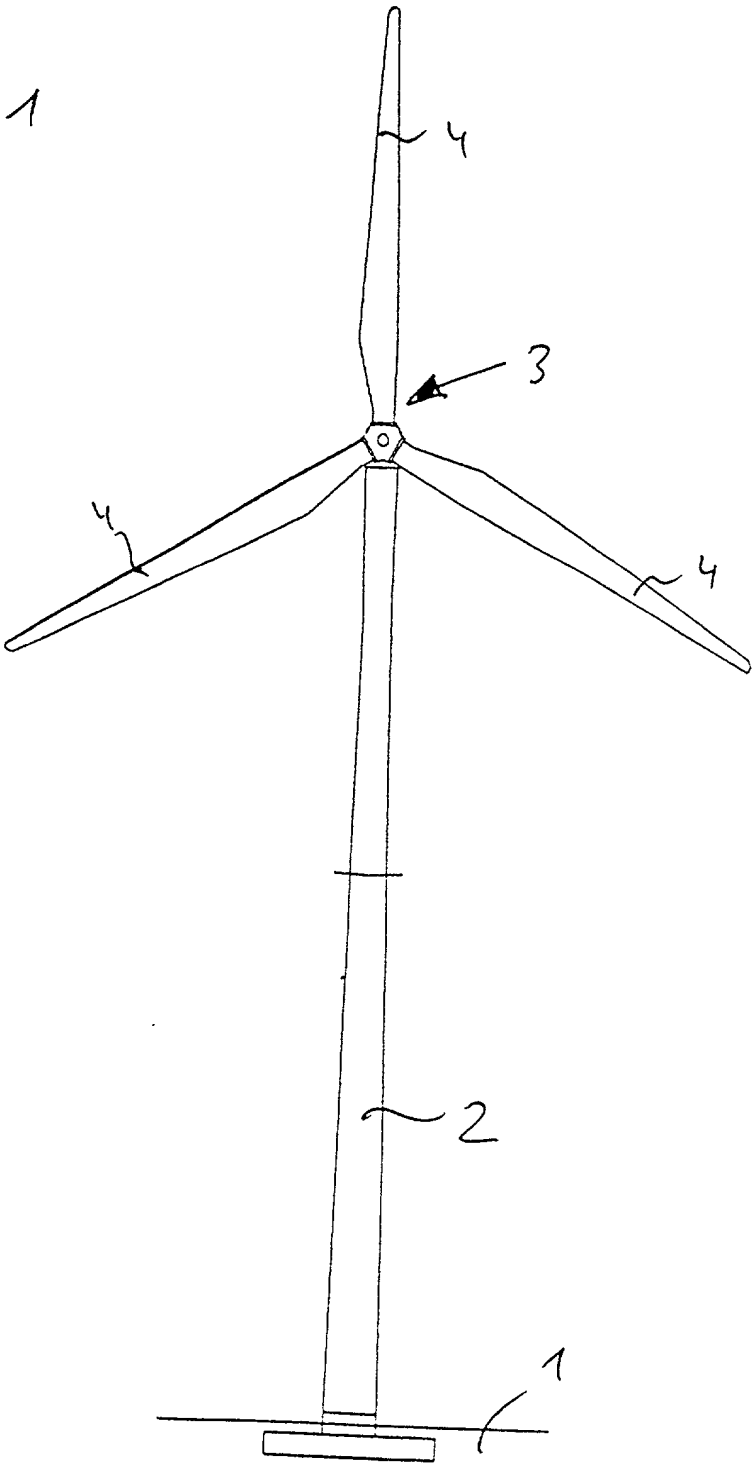


Fig. 2

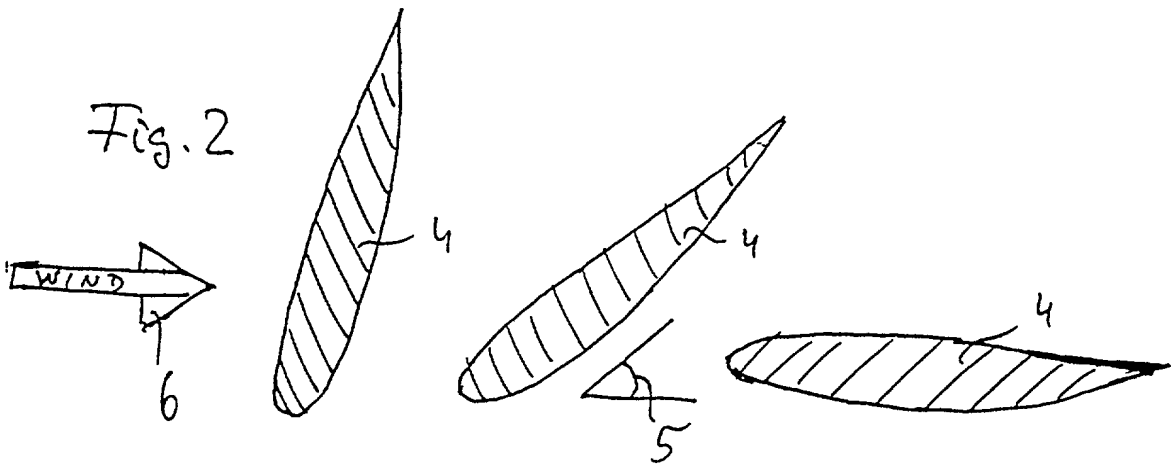
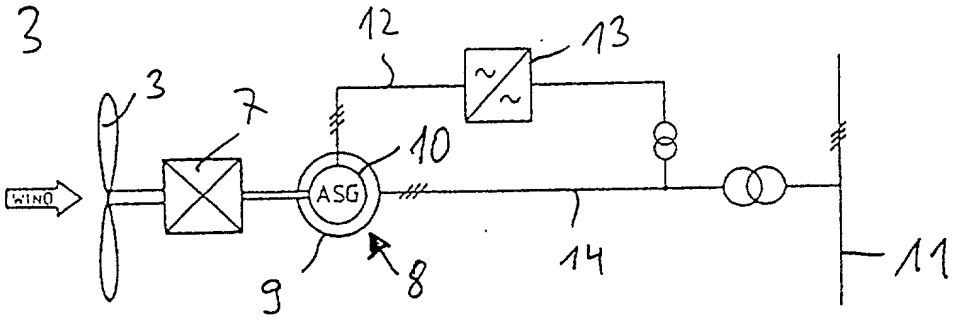


Fig. 3



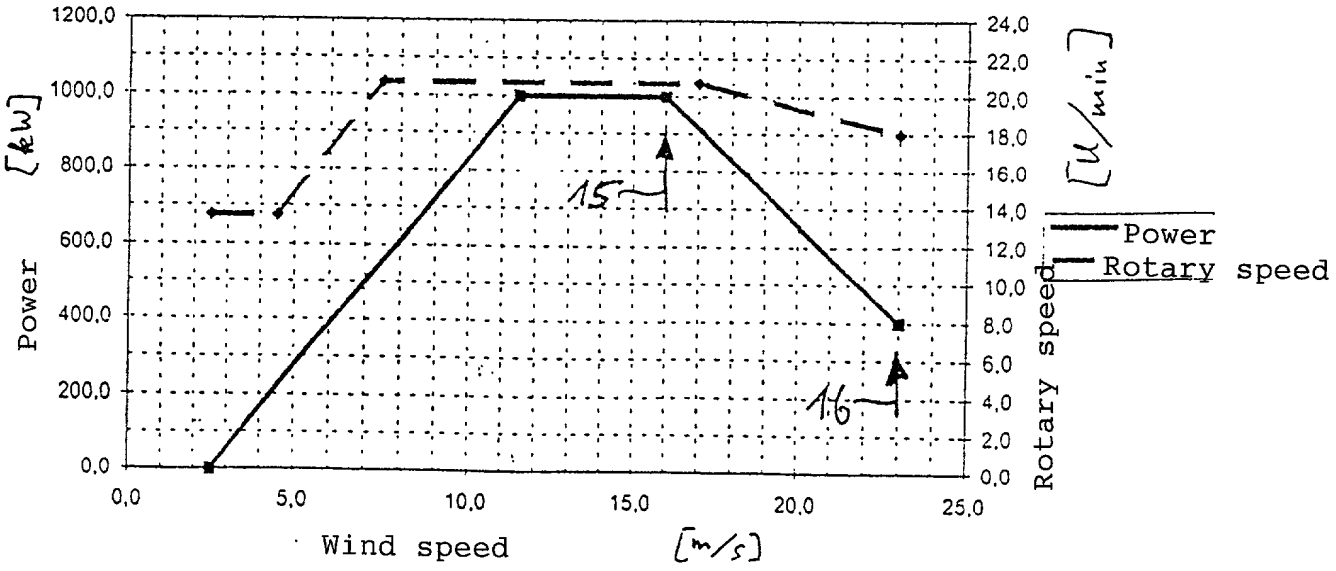


Fig. 4

DECLARATION AND POWER OF ATTORNEY FOR NATIONAL STAGE OF PCT PATENT APPLICATION

As a below-named inventor, I hereby declare that:

Hugo L. SCHIPPMANN

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **WIND ENERGY SYSTEM** the specification of which was filed as PCT International Application number PCT/EP 99/07142 on September 25, 1999.

I hereby state that I believe the named inventor or inventors in this Declaration to be the original and first inventor or inventors of the subject matter which is claimed and for which a patent is sought.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365 (b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior foreign application(s):			Priority claimed:	
198 44 258.0	GERMANY	SEPTEMBER 26, 1998	X	
(Number)	(Country)	(Date filed)	Yes	No
(Number)	(Country)	(Date filed)	Yes	No

As a named inventor, I hereby appoint the following attorney to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Michael J. Striker, Reg. No. 27233

Direct all telephone calls to Striker, Striker & Stenby at telephone no.: (631) 549 4700 and address and all correspondence to:

STRIKER, STRIKER & STENBY
103 East Neck Road
Huntington, New York 11743
U.S.A.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statement may jeopardize the validity of the application or any patent issued thereon.

Signature:	Date: 17.4.01	Residence and Full Postal Address: Huexstrasse 107 23552 Luebeck Germany DE
Full Name of First or Sole Inventor: Hugo L. SCHIPPMANN	Citizenship: GERMAN	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Second Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Third Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Fourth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Fifth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Sixth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Seventh Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Eighth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Ninth Inventor:	Citizenship:	